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(54) System for backing up files from disk volumes on multiple nodes of a computer network

(57) A system for backing up files from disk volumes on multiple nodes of a computer network to a common random-access backup storage means. As part of the backup process, duplicate files (or portions of files) may be identified across nodes, so that only a single copy of the contents of the duplicate files (or portions thereof) is stored in the backup storage means. For each backup operation after the initial backup on a particular volume, only those files which have changed since the previous backup are actually read from the volume and stored on the backup storage means. In addition, differences between a file and its version in the previous backup may be computed so that only the changes to the file need to be written on the backup storage means. All of these enhancements significantly reduce both the amount of storage and the amount of network bandwidth required for performing the backup. Even when the backup data is stored on a shared-file server, data privacy can be maintained by encrypting each file using a key generated from a fingerprint of the file contents, so that only users who have a copy of the file are able to produce the encryption key and access the file contents. To view or restore files from a backup, a user may mount the backup set as a disk volume with a directory structure identical to that of the entire original disk volume at the time of the backup.

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